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ECONOMIC GAINS OF THE U.S.S.R. RESULTING FROM THE
SITUATION OF CONTINENTAL WESTERN EUROPE

ELECTRONIC EQUIPMENT

2358

1. Conclusions

It is estimated that the U.S.S.R. through the acquisition of Continental Western Europe could increase its potential in annual production of electronic equipment by mid-1952 by 275 percent. (Estimated production by mid-1952, in millions United States dollars, within the Soviet Bloc 252.5, in Continental Western Europe 695.0)

2. Discussion

In order to logically express the over-all output of the electronic industry of the Soviet Bloc countries and of Continental Western Europe the best common denominator is a monetary unit of measure. The United States dollar, expressed in millions, was selected. No other single unit was considered suitable to measure the output of an industry that includes extremes in size, weight, cost of materials, and complexities of manufacture of its end items and components, detailed specific information on which is lacking for the Soviet Bloc.

a. For the purpose of analysis, the electronic industry was divided into four main categories: (1) tubes; (2) radio equipment; (3) telephone and telegraph equipment; and (4) cable and wire.

b. The study as compiled divides the electronic equipment industry into two distinct production stages. The first stage being the period from the present to mid-1952, the second stage, the periods ending in mid-1953 and mid-1954, respectively. For Continental Western Europe, electronic equipment production and capacities, after Soviet acquisition, is estimated to continue on about the same basis as before until mid-1952. From mid-1952 to mid-1953 and from mid-1953 to mid-1954, the second stage, it is estimated that there will be a very considerable increase in production output. This estimated increase in production

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output is based on the assumption that raw materials will be available together with the skilled personnel required to place production operations on a two or three shift basis. (All capacity figures used in this study are based on single-shift operation.)

c. The more obvious bottlenecks which may accrue, under Soviet acquisition, to curtail production output or to prevent estimated production increases, are critical raw materials and skilled workers. Shortages of electric power and inadequacies of transportation facilities may also prove to be major bottlenecks in production output.

3. Statistical Summary

The attached tabulations show in millions United States dollars the estimated capacities and production outputs for both the countries of the Soviet Bloc and for the countries of Continental Western Europe.

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POTENTIAL ECONOMIC GAINS OF USSR RESULTING FROM THE
ACQUISITION OF CONTINENTAL WESTERN EUROPE

NIE-40

Section II-B-12, Electronic Equipment

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I. ESTIMATED PRODUCTION, PRODUCTION CAPACITY, AND INVENTORY
SOVIET BLOC AND WESTERN EUROPE

Unit: Million United States dollars, 1951
(See footnote #1)

Country	Estimated Production 1951 (See footnote #2)	Est. annual production rate Mid-1952	Peak annual production World War II (See footnote #3)	Estimated production capacity		Estimated annual production rate	
				End-1951 (See footnote #4)	Mid-52	Mid 53	Mid-54
USSR	116.0	152.0		75.0	97.0	187.0	252.0
<u>Soviet Satellites 1951</u>							
Poland	13.0	14.0		13.0	14.0	16.0	19.0
Czechoslovakia	24.0	28.0		24.0	28.0	41.0	54.0
German, East	27.0	27.0		27.0	27.0	40.0	53.0
Hungary	27.0	30.0		27.0	30.0	37.0	44.0
Romania	Insignificant						
Bulgaria	Insignificant						
Albania	Insignificant						
Communist China	1.0	1.5		2.0	2.0	4.0	4.0
North Korea	Insignificant						

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Country	Estimated production 1951 (See footnote #2)	Est. annual production rate Mid-1952	Peak annual production World War II (See footnote #3)	Estimated production capacity Mid-1951 (See footnote #4)	Mid-52	Estimated annual production rate Mid-53	Mid-54
Inner Mongolia	Insufficient						
Total, Soviet Bloc	208.0	252.5		168.0	198.0	325.0	426.0
Western Europe							
Austria	33.0	38.0		33.0	38.0	59.0	62.0
Belgium	20.0*	23.0*		28.0	28.0	37.0	45.0
Denmark	26.0*	28.0*		29.0	31.0	34.0	37.0
France	4.0	4.0		4.0	4.0	8.0	11.0
Germany	143.0*	201.0*		204.0	224.0	314.0	402.0
Greece	Insufficient						
Italy	62.0*	86.0*		155.0	155.0	236.0	318.0
Luxembourg	Insufficient						
Netherlands	79.0*	87.0*		88.0	96.0	173.0	246.0

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Country	Estimated production 1951 (See footnote #2)	Estimated annual production rate Mid-1952	Peak annual production World War II (See footnote #3)	Estimated production capacity Mid-1952 (See footnote #4)	Estimated annual production rate Mid-1953	Mid-1954	
Norway	10.0*	10.0*		13.0	13.0	20.0	23.0
Portugal	Insufficient						
Spain	Insufficient						
Sweden	4.0	4.0		15.0	15.0	22.0	30.0
Switzerland	66.0	69.0		74.0	77.0	96.0	115.0
Denmark	17.0	20.0		35.0	35.0	45.0	68.0
Finland	Insufficient						
West Germany	103.0	124.0		149.0	157.0	185.0	251.0
West Berlin	(See footnote #5)						
Yugoslavia	.5	1.0		.5	1.0	1.0	1.0
Total Western Europe	567.5	695.0		827.5	874.0	1230.0	1614.0

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Footnotes:

1. United States dollar values used in this table are based on replacement costs of comparable United States electronic products at current wholesale prices, with the exceptions of the totals for Belgium, Italy, Netherlands, Norway and Poland. Totals for these countries were obtained by currency exchange conversions from the respective domestic currencies to United States dollars, based on official exchange rates for the month of July 1951.
2. All countries in this study are currently working on a one-shift basis with the exception of the USSR, which utilizes two shifts in the radio and tube portion of the industry.
3. Peak production figures for World War II are omitted because of an almost complete absence of data.
4. All capacity estimates are based on single-shift operations.
5. Figures for West Berlin are included with West Germany totals.
- * Official estimates.

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II. General Discussion

In this study the contributor has considered the electronic equipment industry generally to include the production of electronic tubes, radio, radar, telephone, and telegraph equipment, telecommunication wire and cable, and the components used in the manufacture of end items in the above categories.

The monetary unit was selected as the best common denominator to express the over-all output of the electronic industry. No other single unit is considered as suitable to measure the output of an industry that includes extremes in size, weight, cost of materials, and complexity of manufacture of its end items and components. For a more precise understanding of country production totals, however, the user is urged to consult the individual country discussions of the nature of the industry within each country, given in Section III of this contribution.

For the purpose of analysis, the electronic industry was divided into four main categories: 1) tubes, 2) radio equipment, 3) telephone and telegraph equipment, and 4) cable and wire. No attempt was made to analyze component parts production (except tubes), as there were no data available on this portion of the industry. In general, data used were in the form of government statistics on production for all or main categories of an entire country's electronic industry. In no instance were country production totals computed by adding the outputs of individual factories. Where individual factory and spot data were available, however, they were used to check related totals for country-wide production. Methods of computing dollar values from source data varied widely, depending upon the units in which original production figures were available. Original data were obtained in such diverse units as metric tons, unit items, conductor kilometers,

and foreign currencies. The general method employed was to estimate dollar values for each of the various types of units in each main category, and, using these "price lists," calculate totals for any given quantities. Direct currency conversions were avoided wherever possible and numerous cross checks and comparisons were used in every stage of the computations. Percentage figures shown in all portions of this contribution are based on computed or estimated dollar values.

This study was considered by the contributor to be divided into two distinct stages: first, all portions dealing with conditions through Mid-1952, and second, other portions dealing with assumed conditions from Mid-1952 through Mid-1954. Differences in the treatment of these two stages are discussed below.

The salient assumption used in the first stage is that the electronic industry in all areas will follow present discernible trends until Mid-1952. For Western Europe this assumption can be interpreted as a "business-as-usual" condition, with industrial activity being mainly dependent upon meeting normal civilian orders. As it relates to the present Soviet Bloc, this assumption can be taken to mean that the industry during this period would be devoted primarily to the output of military equipment within the limitations of existing technical know-how, production facilities, and available raw materials. In general, production capacity estimates for all countries are based on single-shift operations.

In the second stage it became necessary to make several specific assumptions for the electronic industry in addition to the six given assumptions for the over-all study. However, none of these additions is believed to conflict with any of the given assumptions. The specific assumptions are as follows:

a. A sufficient supply of raw and semi-finished materials is available to meet all production demands. (This was necessary

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because the contributor could not estimate the competing and larger demands of other industries.)

b. The bottleneck portion of the industry is in the production of magnetrons, ruggedized sub-miniatures and other special types of centimeter tubes. Consequently, this portion of the industry is utilized to maximum capacity.

c. End items in greatest demand are radar sets, VT fuzes, special test equipment, and military radio communication equipment.

d. Existing designs of components and end items compatible with Soviet military designs are kept in production.

e. A major portion of civilian production is diverted to military types without any significant time lag or decrease in the value of industrial output rate.

f. The supply of skilled manpower is sufficient to provide two full shifts in the bottleneck portion (tubes) of the industry by Mid-1953 and three shifts by Mid-1954.

g. Demands on the telephone and telegraph equipment and the cable and wire portions of the industry are such that only one-shift capacity is utilized.

h. The monetary value of the output for each portion of the industry is directly proportional to the number of shifts used in each portion.

i. No portion of the electro-technical industry or other industries is converted to the production of electronic items.

j. No significant time lag occurs between the production of components and the assembly of end items.

k. Special conditions, differing from the foregoing assumptions, apply to the Far East area (see China discussion).

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III. Individual Country Discussion

USSR

In the absence of figures on electronic production, it has been necessary to make estimates based in most cases on the estimated expansion of the operating facilities, as announced by the USSR or as assumed from estimates made of Soviet civilian and military electronic equipment to carry out different types of Soviet activity. The figure on tube production for 1951 is somewhat lower than that arrived at in the study "Soviet Electron Tube Capabilities," 12 February 1951, by G-2, Arm AC/S, because consideration was given to the problems encountered by the Soviets in training additional personnel and to the high percentage of rejects in the Soviet tube industry. The value of total estimated current production is divided as follows: Radio equipment -- 70%, tubes -- 17%, wire and cable -- 7%, and telephone equipment -- 6%. The production facilities have been greatly expanded since World War II by the building of new factories. Production of radar and other super-high-frequency electronic equipment is still inadequate for Soviet needs.

POLAND

The Polish electronic industry was never large enough to compete with the larger European countries, and 67% of this was destroyed during the war. With the acquisition of German territory, however, the cable and wire capacity has become a considerable item. Poland is in the midst of a six year plan for electronic expansion. This plan makes extravagant claims for Poland's ability to increase production by 10 and 15 times current output. In 1951 only two state owned factories were making radio sets. Most radios were imported from the Netherlands, Sweden, and the United Kingdom. The

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production of radio sets in Poland has not developed comparably with that of other European countries. The country has practically no trained technical personnel. Percentages are given for electronic production: Tube -- 2%, radio -- 14%, wire and cable -- 8%, and telephone and telegraph -- 4%.

CZECHOSLOVAKIA

The Czechoslovakian electronic industry is believed to be expanding at a rate of approximately 10% per year at the present. Diversification of the industry is indicated by the fact that the value of estimated 1951 and 1952 production is composed of the following elements: Wire and cable -- 47%, radio -- 31%, tubes -- 12%, and telephone equipment -- 10%. Estimates of production were based on official Czech production statistics for the electronic industry, to which was applied an expansion factor based on the announced intentions of the Czech government.

GERMANY (EAST)

It is impossible to find reliable figures on electronic production in the Soviet Zone of Germany or the Soviet Sector of Berlin. Consequently the figures in chart represent estimates entirely. The figures for current production are based on the premise that the electronic production in the area is now, and was during World War II, approximately 25% of that in Western Germany, with the exception of wire and cable, which was considered to be 10%. Diversification of the industry is indicated by the fact that the value of estimated 1951 and 1952 production is composed of the following elements: Radio equipment -- 37%, telephone equipment -- 33%, wire and cable -- 19%, and tubes -- 11%. It should be noted that, at the present, the USSR apparently has a policy of 1) trying to lessen its dependence on the German electronic industry and 2) failing to supply the German electronic industry with raw materials in the amount needed for capacity production.

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HUNGARY

Hungarian electronic production is being given maximum assistance by the USSR. 1952 tube capacity will be greater than peak war production. The subsidiary companies of the many large German and English firms have been nationalized and are in full production. Wire and cable and telephone equipment production accounts for over 75% of the total electronic production. The greatest part of the electronic production is earmarked for the USSR. It is assumed that at least 75% of production is for military purposes. The industry is employed as follows: Tubes -- 9%, radio -- 13%, telephone and telegraph -- 41%, and wire and cable -- 37%.

RUMANIA

There is a small electronic industry in Rumania but its total output is believed to be insignificant. A small, but unknown, amount of radio and telephone equipment is produced by a former Standard Telephone and Radio Company factory in Bucharest, and there are a few smaller assembly and repair plants in operation. Wire and cable are also produced, but in very limited quantities. Reports of tube production have not been confirmed. Such production capacity as there is at present is believed to be used at near maximum extent.

BULGARIA

Electronic production in Bulgaria is insignificant in comparison with the outputs of Hungary, Czechoslovakia, and Poland. The few plants known to be in operation are either repair shops or small assembly plants using imported components.

ALBANIA

There is no electronic manufacture in Albania.

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SECRET**SECURITY INFORMATION**CHINA

The manufacture of electronic equipment in China has never been a significant industry, except under Japanese rule. Dependency upon imported components, loss of production machinery through Soviet looting, lack of refined raw materials, and insufficient technical and managerial manpower are primary deterrents to the growth of the industry.

For the purpose of this study it has been necessary to assume that the USSR is willing and able, after the occupation of Western Europe in Mid-1952, to supply the necessary components to enable the Chinese to utilize maximum capacity for the manufacture of all types of simple military electronic end items.

The present Chinese electronic industry is a combination of centralized manufacturing facilities and "cottage type" industry. The combined industry works the equivalent of a 12 hour shift. For the purpose of projecting forward to Mid-1953, Mid-1954, it is assumed that the demands on the industry will result in the establishment of a 2 shift, 24 hour work day for 1953 to be carried forward to 1954.

Production of the Chinese industry is divided in the following manner: Telephone and telegraph -- 17%, wire -- 57%, radio -- 26%.

NORTH KOREA

Any estimate of electronic production in North Korea is impossible at this time. The present military action in Korea probably has destroyed whatever potential that had existed in Korea. It is considered highly improbable that any significant electronic production will be restored in North Korea during the period covered by this study.

INNER MONGOLIA

There is no known electronic production in Inner Mongolia.

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SECRET**SECURITY INFORMATION**AUSTRIA

Austria has had the most phenomenal rise in electronic production of any Western European country since the close of World War II. No actual figures are available on electronic production in the Soviet zone of Austria; however, estimates based on the number and nature of Soviet-controlled factories indicate that East Austria produces about 25% of the total output in West Austria. The largest electronic plants in the country are subsidiaries of companies located in other countries. The over-all industry is thought to be operating at near capacity, though the supply of technical personnel is more than adequate for further expansion. No military electronic production is permitted in West Austria at present. Experimental work is being conducted in the fields of VHF and UHF radio equipment in West Austria, but no production of this type of equipment is in progress. The total production of the country's over-all industry is believed to be divided about as follows: Tubes -- 8%, radio -- 23%, telephone and telegraph -- 26%, and cables and wire -- 43%.

BELGIUM

Telephone and telegraph equipment and cable and wire predominate in the Belgian electronic industry. The quality of production in this field is high and on par with most of Western Europe. The industry is presently operating at 70% of capacity with a 44-hour work week. The production projected to Mid-1952 is based on past trends in production for a stabilized economy. Production capacity was assumed constant until production approached to within 90% of capacity. Percentages of the industry devoted to various phases of production are as follows: Tubes -- 2%, radio -- 27%, wire and cable -- 35%, and telephone and telegraph -- 36%.

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DENMARK**SECRET****SECURITY INFORMATION**

The Danish industry is operating at near 100% of capacity in 1951. The major portion of the industry is devoted to cable and wire manufacture -- 46%, and telephone and telegraph manufacture -- 43%. Production has been steadily increasing for the past several years with a gradual production rise. Near 100% of capacity is interpreted as approximately 90% of capacity with a 10% reserve capacity which will be maintained up to Mid-1952. This figure was assumed as a result of past trends in production. Only 4.5% of present production is devoted to military items.

FINLAND

The Finnish electronic industry produces equipment of high quality, but the size of the industry is limited by the high cost of production. Radio production accounts for over 95% of the present output. Tube production is insignificant. Wire and cable production and telephone production equally divide the remaining portion of the industry. Most estimates are based on production figures supplied by U.S. intelligence personnel in Finland, who report that the industry is operating at near capacity on a one shift basis.

FRANCE

Present French electronic production can be increased by 30% without change in the present one eight hour shift per day basis. The present work week for the industry is 32 hours. All phases of production are represented in France with no one phase predominating. France is one of the few countries in Europe engaged in the production of radar, though on a small scale. France is not producing sub-miniature tubes at present, but the ability to do so exists through some of the industry's affiliations with Philips of Netherlands. Research in France in the electronic industry is on the level with

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the U.S. development, but the production of purely French designed equipment has lagged because of the influence of foreign affiliations, which has resulted in the utilization of foreign designed equipment. The breakdown within the industry is as follows: Tubes -- 8%, radio -- 32%, wire and cable -- 20%, telephone and telegraph -- 40%. At present, 24% of the industry is devoted to the production of military equipment.

GREECE

The industry in Greece is insignificant at the present. The industry is restricted to the assembly of radio receivers from imported component parts. The present value of the industry is very low and would have no significance in a military situation.

ITALY

The Italian industry is operating at only 40% of capacity as a result of a lack of orders. Generally, all plants devoted to electronic production have a surplus of idle machinery. Considerable foreign affiliations exist in Italy and several reports have stated that the technical knowledge of the industry is good. Experimental work is being conducted in the field of radar and can be exploited for the production of this equipment. The industry's output is divided about as follows: Tubes -- 7%, radio -- 47%, wire and cable -- 22%, telephone and telegraph -- 24%. Only 8% of the industry is devoted to military production at the present.

LUXEMBOURG

The electronic industry in Luxembourg is totally lacking. Information available indicates that there is no significant potential for developing this industry.

NETHERLANDS

The radio and tube portion of the industry occupies the predominate position in Netherlands. The leadership in this field

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Europe when combined with its subsidiaries Philips would be the greatest single asset in the Soviet acquisition of Western Europe. Philips has the knowledge, skill, and production facilities necessary to produce any of the specialized items required by the USSR. They have the necessary ability to produce radar, sub-miniature tubes (on which considerable research work has been done) for VT fuzes, and electronic parts for guided missiles. The electronic industry in the Netherlands is divided about as follows: Tubes -- 22%, radio -- 58%, wire and cable -- 5%, telephone and telegraph -- 15%. Using the expansion trend for Philips, it is estimated that an excess over production is maintained at a level so that the industry is currently operating at 90% of capacity and will maintain this rate until Mid-52. At present, only 6.7% of the industry is devoted to military production.

NORWAY

Electronic production in Norway is small but not insignificant, and is concentrated in the commercial radio, telephone and telegraph, and cable and wire fields. The following figures are an indication of the relative importance: Radio 55%, wire and cable -- 15%, telephone and telegraph -- 30%. Tube requirements are supplied entirely by imports. The entire industry is presently operating at 75% of capacity and it is assumed that there will be no increase in capacity by Mid-1952 until a larger portion of the industry is utilized. Only 4.3% of the present production is devoted to military items.

PORTUGAL

There is only one electronic producer in Portugal of any considerable size, but the production of Portugal is considered insignificant, as the total annual production of this firm when combined with its other electrical production does not exceed one

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million dollars. The quality and quantity of production is poor and the major portion of the components must be imported.

SAAR

There is no electronic production in the Saar.

SPAIN

Information on the Spanish industry is unreliable and spotty. Figures for the telephone industry were arrived at by an examination of the expansion of the Spanish Telephone Company facilities over a two year period and correlating this with information stating that the major portion of the equipment is manufactured in Spain. Data were available on the radio and tube industry showing that Spain manufactures almost all of its needed components and one quarter of its tube requirements. Present production of the over-all industry is at 30% of capacity. Present production is divided into the following estimated categories: Tubes -- 7%, radio -- 47%, wire and cable -- 5%, telephone and telegraph -- 41%. The quality of production, technical skill, and research ability is below the average standards of Western Europe.

Spain's major contribution to the Soviet war effort would be its supply of critical electronic raw materials. Spain has an abundant supply of tungsten and mercury, the extraction of which could be increased and used to supply other Western European nations that are deficient in these critical materials.

SWEDEN

The major portion of the Swedish industry is devoted to telephone, telegraph, wire, and cable manufacture. This portion of the industry is dominated by L.M. Ericsson and its subsidiaries, which produce about 75% of the nation's electronic industry output. Radio accounts for 17% and tubes (telephone repeater tubes) account for the remaining 8%. The industry is in a better position than most of the industry in

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Europe as a result of the nation's neutralism in the last war. The production trend has shown a steady increase in the last decade, and it is predicted that this trend will continue up to Mid-1952. This trend will necessitate an excess capacity over and above present production rates. Capacity will be increased and the industry will be operating at 90% of capacity until such time as the demand for Swedish products diminishes, which is not foreseen by Mid-1952.

SWITZERLAND

Capacity figures for Switzerland may introduce considerable error owing to the nature of the industry. The industry operates on orders and is so diversified that the industry can, on completion of an electronic order, be shifted to the production of another type of electrical item which is in no way related to the electronic field. A portion of the capacity figure for the electronic field may be duplicated in a survey of the portion of the electrical industry not devoted to electronics production. The Swiss industry must import all the raw materials used in electronic items. The technical, research, and production skill of the industry is high and it is capable of producing all of the specialized items required by the Soviets, including radar, VT fuzes, and electronic parts for guided missiles. At present the industry's output is divided into the following portions: Tubes -- 1%, radio -- 46%, telephone and telegraph -- 37%, and wire and cable -- 16%.

TURKEY

Turkey has neither the existing nor potential manufacturing capabilities, within the time limits of this study, to provide a significant contribution to the economic gains of the USSR through the occupation of that country. Any exploitation of Turkey's resources for electronics production would come through the utilization elsewhere of the country's raw and semi-processed materials

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that could be used in making components requiring copper, rubber, timber, and glass.

GERMANY (WEST)

Germany has the largest potential capacity for electronic production on the continent of Europe. The industry is operating at about 60% of capacity in the majority of electronic fields, and in the case of wire and cable production the industry is operating at 17% of capacity. Telefunken and the German branch of Philips account for 75% of the tube output, while Siemens and Halske and AEG are the largest telephone and telegraph producers. Under the present laws Germany is not allowed to make either radar or television equipment, but could quickly convert to these items if given permission. Germany, at present, is making no military electronic equipment. Radio equipment accounts for 45% of the 1951 electronic production, with telephone and telegraph equipment showing 25% and tubes 10% of total production. Germany's cable and wire capacity is greater than that of any continental European country and accounts for 20% of Germany's present electronic production.

Electronic production for West Berlin is included in the West German totals. No detailed information is available to enable the contributor to differentiate between total West German production and West Berlin production.

WEST BERLIN

Specific information was not available to enable a detailed breakdown between West Berlin production and the total production for Western Germany. The production was necessarily presented in a combined form and will be found under West Germany.

West Berlin has an important productive capacity for the production of high power transmitters and mobile and fixed FM transmitters. It is estimated that West Berlin produces 1/3 of

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the tubes credited to West Germany. Information on the telephone and telegraph industry is lacking.

YUGOSLAVIA

Electronic production in Yugoslavia is negligible except for telephone equipment, which is still only a fraction of that manufactured by satellite countries, such as Poland and Hungary. There is no tube production in Yugoslavia and the radio industry is small and limited to the assembly of imported components. Production of telephone and telegraph equipment, which consists only of the simple types, accounts for 93% of the industry's output. The remaining 7% is cable and wire. The only information on electronic production available for this study was obtained from a Yugoslav Army Officer, whose reliability is considered questionable.

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